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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,261	12/15/2003	Mitsugu Sato	H6808.0005/P005-A	1481

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EXAMINER

JOHNSTON, PHILLIP A

ART UNIT	PAPER NUMBER
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2881

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12/26/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/734,261

Applicant(s)

SATO ET AL.

Examiner

Phillip A. Johnston

Art Unit

2881

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2007.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 24-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 24-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 7-2007-10-2007.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

***Detailed Action***

1. This Office Action is submitted in response to Amendment filed 10-12-2007, wherein claims 1-23 were previously canceled, claims 24 and 34 are amended and new claim 35 has been added. Claims 1-35 are pending.

***Examiners Response to Arguments***

2. Applicants arguments are moot in view of new grounds for rejection necessitated by the applicant's amendment.

***Claims Rejection - 35 U.S. C. 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 24-26, 28, 33, and 34 are rejected under 35 U.S.C. 102 (b) as being clearly anticipated by Keese, U.S. Patent No. 5, 627,373.

5. Regarding claim 24, Keese discloses a charged particle beam apparatus comprising: a charged particle source; an optical element for adjusting a charged particle beam emitted by the charged particle source; an alignment deflector for aligning the axis of the charged particle beam with respect to the optical element; and a control device for calculating a two dimensional deviation between images when the optical element is varied, See Col. 4, line 23-44, where Keese teaches scanning electron microscope 10 having electron gun 14 (the particle source), condenser lenses 19 and

20 (note Figure 1 below) alignment coils 22 (deflectors), astigmatism coil 25, and objective lens 28 (optical element), which focuses the beam onto specimen S.

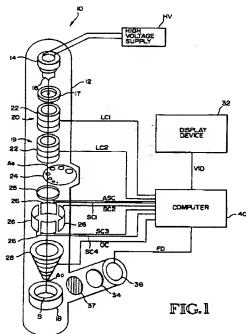


FIG. 1

Keese also teaches controlling microscope 10 with computer 40 (control device), which automatically varies the focus of objective lens 28 between extremes of the focal range (a variation of an operation condition), then image processing circuit 46 detects and generates image translation signals IND (a two-dimensional deviation between images) from which the amount of beam alignment correction is calculated with control circuit 50, and supplied to the alignment coils as signals LC1 and LC2 (a parameter of each alignment coil) for adjusting electron beam alignment. Col. 5, line 38-62.

Keese further teaches that the alignment proceeds in an iterative manner, which stops when the difference in magnitude of the IND image translation signals (a two-dimensional deviation between images) is less than a prescribed threshold, for example

5 pixels out of 500 pixels (nearly zero) in each dimensional direction of the images compared. Col. 7, line 20-36.

Regarding the amended limitation, wherein the control device calculates a condition parameter of the alignment deflector based on different two dimensional deviations obtained by supplying the alignment deflector with different signals and wherein the control device calculates a signal supplied to the alignment deflector with the calculated condition so that the two dimensional deviation becomes zero or nearly zero regardless of variation of an operation condition of the optical element. Keese teaches the beam alignment control technique above, where the control circuit supplies signals to the alignment coils (deflectors) after they are calculated from IND image translation (two dimensional deviation) analysis. Keese also teaches at Col. 2, line 57-67; and Col. 3, line 15, that image analysis of the sample is performed along two different axes of the edge of the sample.

6. Regarding claims 25 and 26, as described above, Keese teaches detecting the amount of image translation as the objective lens focus is varied and calculates corrections(an unknown number) to the beam alignment. Keese further discloses that pattern recognition circuit 48 determines the absolute value of the peak first derivative of the smoothed image intensity of each raster scan line and derives an average over all scan lines, which defines one relationship between the deviation and the alignment condition. Col. 5, line 38-59.

7. Regarding claim 28, Keese teaches that the control circuit stores, analyzes, and calculates corrections to beam alignment from the IND signal, as described above.

8. Regarding claim 33, Keese teaches objective lens 28 is an optical element for focusing the electron beam and astigmatism coil 25 for correcting astigmatism, as described above regarding claim 24.

9. Regarding claim 34, Keese teaches the apparatus used in this method claim, as described above regarding claim 24.

***Claims Rejection – 35 U.S.C. 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 27, and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,627,373 to Keese.

12. Regarding claim 27, Keese teaches all the required limitations of claim 27, as pointed out with respect to claim 24 above, but fails to teach calculating a coefficient for determining the condition of the alignment deflector. However it would have been obvious to one of ordinary skill in the art that performing calculations with control circuit 50 to determine the relationship between the amount of image translation and beam alignment would include calculating a coefficient since such calculations are commonly performed in the art.

13. Regarding claims 29-31, Keese teaches all the required limitations of claim 27, as pointed out with respect to claim 24 above, but fails to teach the presence or absence of structure information necessary for calculating the amount of deviation of the image. In construing claims 29-31, the examiner has utilized paragraph [0063] of the specification to define "structure information" as an arrangement or a structure which is capable of controlling a beam passage position two-dimensionally at least in a main plane of the objective lens, and from this the examiner has interpreted that detection of the presence or absence of "structure information" is detection of the presence or absence of alignment coil current (excitation current), which is associated with the magnitude of image translation or two dimensional deviation of the image.

As a result, the use of current detection in alignment coils is well known in the art. Therefore it would have been obvious to utilize current sensing in the alignment apparatus of Keese to provide beam correction.

14. Claims 32 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,627,373 to Keese, in view of Onoguchi, U.S. Patent No. 6,067,164.

15. Regarding claim 32, Keese teaches all the required limitations of claim 32, as pointed out with respect to claims 29-31 above, but fails to teach the use of a two-dimensional Fourier transform to quantify the image.

16. Onoguchi teaches an astigmatism correction apparatus for correcting an astigmatism in an electron optics device that utilizes a Fourier transform unit to obtain a

binarized image. See Column 4, line 65-67; Column 5, line 1-25; Column 19, line 51-67; and Column 20, line 1-3.

17. Onoguchi modifies Keese to provide a Fourier transformed image from which an adjustment unit for adjusting the stigmater of the charged particle beam optical system according to the intensity and the direction of the astigmatism determined by the astigmatism information calculation unit.

18. Therefore it would have been obvious to one of ordinary skill in the art that Keese would use a Fourier transform in accordance with Onoguchi, to provide an astigmatism correction technique for correcting an astigmatism in an electron optics device by adjusting a stigmater of a charged particle beam optical system in the electron optics device.

19. Regarding new claim 35, Keese teaches a beam alignment control technique as described above regarding claim 24, where the control circuit supplies signals to the alignment coils (deflectors) after they are calculated from IND image translation (two dimensional deviation) analysis, but fails to teach comparing images using correlation values.

20. Onoguchi teaches calculating the image correlation level (value) between the image regions that are obtained from focal adjustment. Col. 17, line 5-27.

21. Onoguchi modifies Keese to provide a statistical quantity indicating the level of correlation between image regions.

22. Therefore it would have been obvious to one of ordinary skill in the art that the Keese would use the correlation calculation technique of Onoguchi, to provide



image translation amounts that are used for adjusting and controlling the electron beam optical system.

### ***Conclusion***

4. The Amendment filed on 10-12-2007 has been considered but the arguments are moot in view of new grounds for rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

5. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners

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supervisor Robert Kim can be reached at (571) 272-2293. The fax phone number for the organization where the application or proceeding is assigned is 571 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ

December 18, 2007

  
Jack I. Berman  
Primary Examiner